REMARKS

The Office Action of October 19, 2005 has been received and its contents carefully considered.

Claims 1 and 4 to 14 are all the claims pending in the application, prior to the present amendment. Claims 13 and 14 have been allowed.

With respect to claim 14 and its recitation of an amorphous initial growth portion, the Examiner states that she is maintaining her position "that the amorphous soft magnetic layer taught by Futamoto et al which corresponds to the claimed orientation control layer satisfies this claim limitation". Applicants note that claim 14 has not been rejected over Futamoto et al, but has been allowed. Further, applicants point out that claim 14 states that the intermediate layer has an amorphous initial growth portion. Claim 14 does note recite an amorphous initial growth portion for the orientation control layer.

Claims 1 and 4 to 12 have been rejected under 35 U.S.C. § 103(a) as obvious over Futamoto et al.

Applicants submit that Futamoto et al do not disclose or suggest the presently claimed invention of claims 1 and 4 to 12 and, accordingly, request withdrawal of this rejection.

Of the above claims, claims 1, 11 and 12 are independent. Applicants discuss the independent claims below.

Claim 1 is directed to a magnetic recording medium comprising, on a non-magnetic substrate, at least a soft magnetic undercoat film, an orientation control film that controls the orientation of a film provided directly above, a perpendicular magnetic film having an axis of easy magnetization ~~is~~ generally oriented perpendicular to said substrate, and a protective film, wherein the orientation control film is made of a Co alloy which contains W and the Co content of the orientation control film is at least 20 at% and equal to or less than 85 at%.

Thus, claim 1 requires that the orientation control film is made of a Co alloy which contains W, and the Co content of the orientation control film is at least 20 at% and equal to or less than 85 at%.

Claim 11 is directed to a method of manufacturing such a magnetic recording medium and claim 12 is directed to a magnetic read/write apparatus that contains such a magnetic recording medium. Applicants have amended claims 11 and 12 to also recite that the orientation control film is made of a Co alloy which contains W, and the Co content of the orientation control film is at least 20 at% and equal to or less than 85 at%

The Examiner refers to Table 2, at the top of columns 13 and 14 of Futamoto et al. Table 2 appears in Example 3 of Futamoto et al, which begins at column 10, line 45. The structure of the magnetic recording medium of Example 3 is shown in Figure 6 of Futamoto et al.

The only Co-W alloys that are disclosed in Futamoto et al appear in Table 2, Sample Nos. 11 and 15, where there is disclosed a Co-4 at% W-3 at% Zr film and a Co-3.2 at% W-3 at% Hf.

These alloys do not disclose or suggest the alloys of the orientation control film of claims 1, 11 and 12.

The Co-W alloys disclosed in Sample Nos. 11 and 15 of Futamoto et al contain Co in an amount of 93 to 93.8%. Applicants submit that there is no teaching or suggestion in Futamoto to lower the amount of Co in the Co-W.

Applicants acknowledge that they previously stated that the alloys of claim 1 have more than six times the amount of W disclosed in Futamoto et al. Applicants withdraw this statement since claim 1 does not specify the amount of W and the "six times" number was not correctly calculated.

Applicants point out that they have added new claims 15 to 17 which state that the Co is present in an amount of 20 to 50 at%. Support for the 50 at % recitation of these claims is found in Example 1 which discloses a 50 Co-50 W alloy. Such an alloy is even further removed from the Co content disclosed in Futamoto et al.

In the Office Action, the Examiner states that Futamoto et al teach that the thickness and saturation magnetization of the soft magnetic layer corresponding to the claimed orientation control layer are result effective parameters that affect recording efficiency and areal recording density. The Examiner refers to column 16, lines 25 to 48 in support of this statement. The Examiner argues that, therefore, it would have been obvious to determine the optimal values for thickness and saturation magnetization of the orientation control/soft magnetic layer taught by Futamoto et al. In addition, the Examiner argues that it would have been obvious to adjust the

Co concentration of the soft magnetic layers in order to achieve a desired level of saturation magnetization, since Co is known to be a magnetic element and, therefore, the amount of Co in a given alloy affects saturation magnetization.

In response, applicants point out that the discussion at column 16, lines 28 to 48 appears in Example 5. Example 5 does not contain a Co-W alloy. Example 5 contains three soft magnetic layers, namely, layer 74 made of Fe-25 at % Ni, layer 76 made of Co-6 at % Nb-3 at % Zr and layer 78 made of Fe-5 at % Ta - 10 at % C layer. In Example 5, the total thicknesses of these layers were adjusted to achieve different O/W properties. There is no teaching in Example 5 to adjust the composition of the soft magnetic layers.

Moreover, even if one of ordinary skill in the art would be led to adjusting composition, there is no teaching that the maximum Co content in a Co-W alloy should be 85 at %. The only disclosure of Co-W alloys appears in Example 3 of Futamoto et al, where Sample 11 contained Co-4 at % W-3-at % Zr (93 at % Co) and Sample 15 contained Co-3.2 at % W and 3 at % Hf (93.8 at % Co). Even if one were to seek to optimize the Co amount for the purposes of Futamoto et al, there is no teaching or suggestion that such an optimization could be achieved by lowering the Co % in a Co-W alloy to at most 85 at % Co. Moreover, one seeking to optimize the Co% in a Co-W alloy would be led to experimenting within the range or close to the range disclosed by Futamoto et al. Thus, one might try a value of 93.5 at % Co, or 95 at % Co, or 92.5 at % Co, but nowhere is there a teaching or suggestion to lower the amount to at most 85% Co in a Co-W alloy.

Further, the Examiner's reasoning is based on the assumption that a lower Co-amount would result in an optimization for Futamoto et al, but there is no evidence to support this assumption. It might be that a higher amount results in an optimization. The Examiner's position is based on mere speculation. Further, there is even less teaching or suggestion to employ the Co-W alloy of claims 15 to 17 which recite an upper value of 50 at % Co in a Co-W alloy.

In general, applicants submit that the Examiner is employing hindsight to arrive at the recitations of claims 1 and 4 to 12. There simply is no teaching or suggestions which would lead one to the lower Co amounts of claims 1 and 4 to 12 in a Co-W alloy.

Further, Futamoto et describe, at column 11, lines 4 to 13, that the saturation magnetizations of the soft magnetic film of Samples 11 and 15 in Table 2 are not lower than 1.1T.

In addition, Futamoto et al state, at column 10, line 65 to column 11, lines 3 that "the intensity of the saturation magnetization of the soft magnetic film formed closer to the perpendicular magnetic film is 1.4 T, setting the saturation magnetization of the latter to be larger".

This concept of selecting a film having a higher saturation magnetization value as the soft magnetic film is consistent throughout the Futamoto et al reference. Thus, in column 5, lines 20 to 40, Futamoto et al also suggest to form a soft magnetic film that has a high magnetic saturation value of not lower than 1T.

In contrast, the orientation control film of claims 1, 11, and 12 comprises a Co content of 20 to 85%, which functions to suppress the saturation magnetization within an appropriate range.

The composition and the saturation magnetization value of the orientation control film is described at page 15, line 17 to page 16, line 5. The magnetization saturation value of the orientation control film is claimed in claim 4, based on the above disclosure in the specification.

Claim 4 of the present application indicates that the saturation magnetization of the orientation control film is controlled within a range equal to or less than 200 emu/cc.

The saturation magnetization value of the present invention is achieved by controlling the Co content. Therefore, the composition of the orientation control film is determined in order to achieve an appropriate saturation magnetization value, which results in distinguishing claims 1 and 4 to 12 from Futamoto et al.

Accordingly, applicants emphasize that the saturation magnetization value of Futamoto et al differs from the saturation magnetization value of the orientation control film of the present invention, and that the composition of the orientation control film of claims 1 and 4 to 12 is selected so as to control the saturation magnetization value of the orientation control film within a controlled range.

With respect to claim 9, it requires that a Co, Cr-containing intermediate film have an amorphous initial growth portion. Futamoto et al do not disclose or suggest the structure and composition of claim 9.

In view of the above, applicants submit that claims 1 and 4 to 14 are patentable over Futamoto et al and, accordingly, request withdrawal of these rejections.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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Respectfully submitted,

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